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TITLE: SILICON NITRIDE-BASED CERAMIC
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ABSTRACT:

PURPOSE: To obtain the titled ceramics having a high rupture toughness value and superior strength at high temp. by adding powder of TiN or metallic Ti to Si₃N₄ powder in combination with Y₂O₃, Al₂O₃ or the like as an additive for sintering and by sintering the resulting powdery mixture.

CONSTITUTION: Si₃N₄ powder is mixed with Y₂O₃, Al₂O₃ or the like as an additive for

cooling rate from the calcination temperature to 100°C is adjusted to ≤30°C/min. The sintered silicon nitride produced by this process has uniform texture, contains ≤50% of intergranular crystal based on whole intergranular phase and has a maximum pore diameter of ≤10μm and a pore ratio of ≤0.5%. The sintering assistant used in the sintered material is preferably those containing Y_2O_3 , ZrO_2 and MgO. The present production process enables the production of a sintered uniform silicon nitride having small maximum pore diameter and pore ratio excellent characteristics such as abrasion resistance and rolling fatigue life. Accordingly, the sintered silicon nitride produced by the present process can be extremely effectively used as an abrasion-resistant member, sliding member, etc., as well as a bearing member.

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